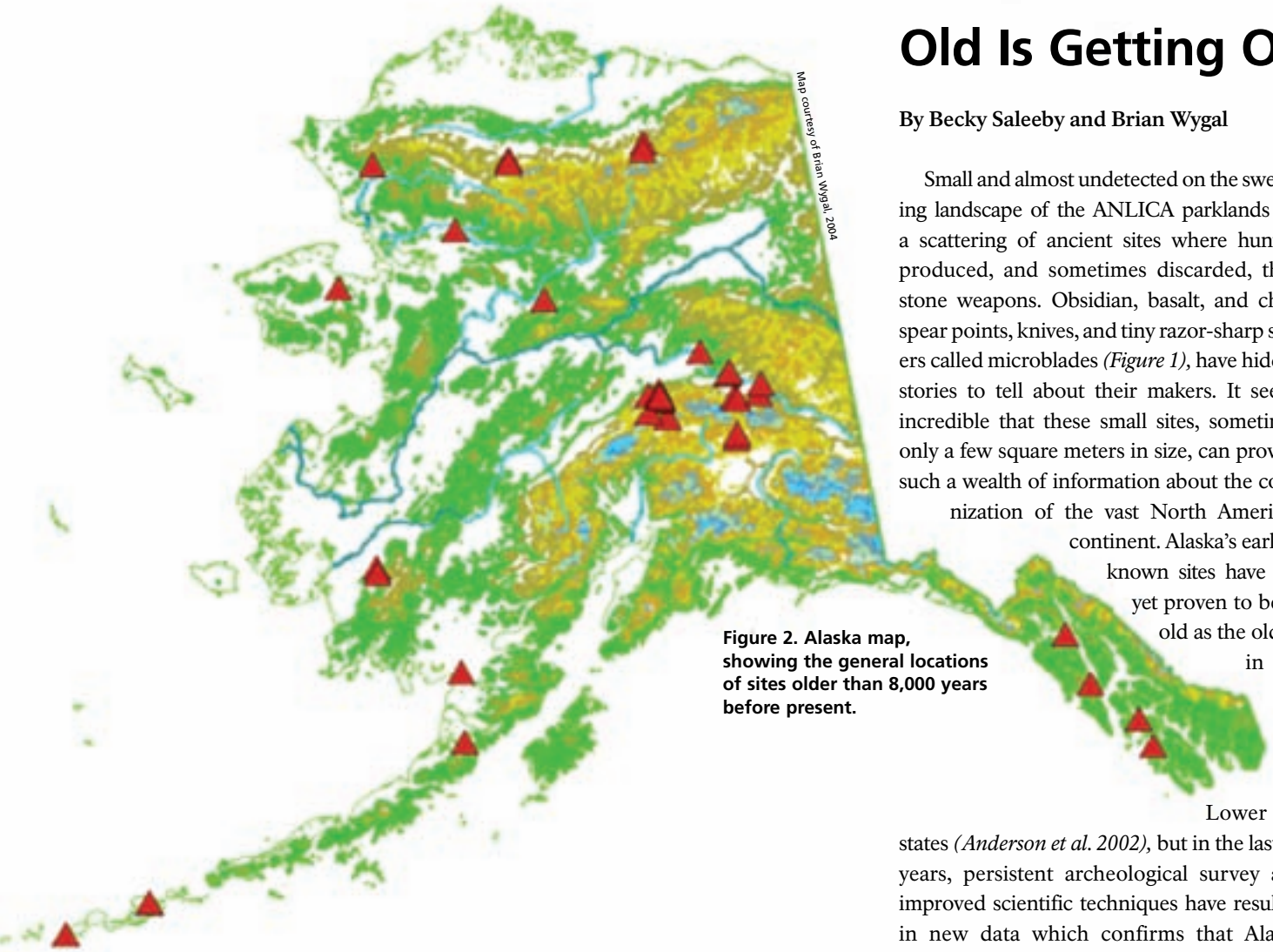
Old Is Getting Older

By Becky Saleeby and Brian Wygal

Small and almost undetected on the sweeping landscape of the ANLICA parklands are a scattering of ancient sites where hunters produced, and sometimes discarded, their stone weapons. Obsidian, basalt, and chert spear points, knives, and tiny razor-sharp slivers called microblades *(Figure 1),* have hidden stories to tell about their makers. It seems incredible that these small sites, sometimes only a few square meters in size, can provide such a wealth of information about the colonization of the vast North American continent. Alaska's earliest known sites have not yet proven to be as old as the oldest in the Lower 48 states *(Anderson et al. 2002),* but in the last 25 years, persistent archeological survey and improved scientific techniques have resulted in new data which confirms that Alaska sites are actually much earlier than we once believed *(Figure 2).*



Map courtesy of Brian Wygal, 2004

Figure 2. Alaska map, showing the general locations of sites older than 8,000 years before present.

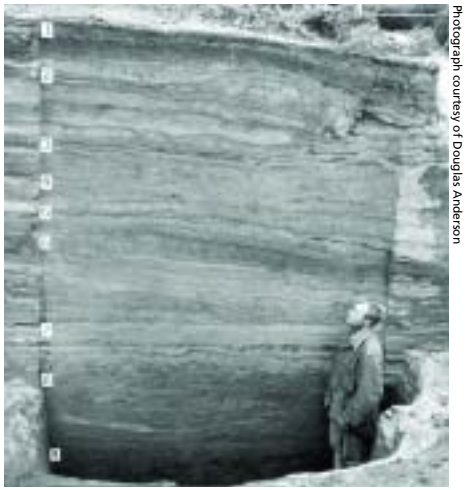
The presence of ancient sites was well known to the framers of the ANILCA legislation. The language of Public Law 96-487 (ANILCA), Section 201, states that several of the newly created park units—Bering Land Bridge National Preserve, Cape Krusenstern National Monument, Kobuk Valley National Park, Noatak National Preserve, and Yukon-Charley Rivers National Preserve—would be managed to protect archeological sites. The oldest of the sites were recognized as providing links between the cultural traditions of Asia and those of North America.

National Park Service photograph by Al Smith

Figure 1: Microblades are a distinctive tool type found at many Alaska prehistoric sites.

Photograph by Richard VanderHoek

Figure 4: Excavation at the Swan Point site, near the Tanana River, Alaska.



Photograph courtesy of Douglas Anderson

Figure 3: Douglas Anderson, who supervised excavation of the Onion Portage site in the late 1960s, points out the many layers of occupation at the site.

The continents, now separated by the waters of the Bering Sea, were once connected in a vast land mass, known as Beringia. Sometime during the last glacial maximum between 21,000 and 17,000 years ago, archeological evidence suggests that groups of people from what is today the Russian far east, began their migration further eastward into North America. Although the routes of their migrations are greatly debated by archeologists, evidence of human presence is well documented by 11,000 years ago, at the end of the geological epoch known as the Pleistocene, when glacial melt waters breached the land and separated Beringia into two continents *(Elias 2001)*.

In 1980 when ANILCA was enacted, archeologists had recorded only a handful of Alaska sites 8,000 years old or older. The dramatic climatic fluctuations and shifts in plant and animal populations at the end of the Pleistocene had leveled off by 8,000 years ago, and the earliest human populations were well established in all regions of

Photograph by Richard VanderHoek

Figure 5: Mammoth tusk fragment, excavated at the Swan Point site.

Alaska. Among the previously recorded sites in the new parklands were Trail Creek Caves in Bering Land Bridge and Onion Portage in Kobuk Valley *(Figure 3)*. Stone tools and bone fragments from several species of animals, including caribou and Pleistocene bison and horse, had been excavated at Trail Creek Caves during the 1960s, but the question of whether human beings were responsible for hunting and butchering these animals was not conclusively determined at that time *(Vinson 1993)*. The picture at the deep, many-layered Onion Portage site was much clearer. The oldest of eight distinct tool complexes was dated at about 8,500 years ago and contained a suite of stone tools, including microblades, similar to those found at Trail Creek Caves *(Anderson 1968)*.

These two sites were dated by conventional radiometric techniques by analysis of charcoal samples from fire hearths or other organic remains, such as bone. The scientific basis of this dating method is that radiocarbon (C14) decays at a known rate, and thus the amount of C14 remaining in a sample can be measured and compared to the level of radiocarbon in the atmosphere in 1950, the year established as 0 BP (before present). Radiocarbon laboratories report the results of the analysis in radiocarbon years before present (rcbp), along with an error factor, giving an age range for human occupation at each site.

The oldest radiocarbon dated Alaska site known in 1980 was the Dry Creek site, near Denali National Park in the Interior. The bones of large Pleistocene mammals, such as elk and bison, were found at Dry Creek, proving beyond a doubt that ancient hunters killed species of animals now extinct in Alaska. There were also a variety of tools, including small triangular or teardrop-shaped stone points. Archeologists hypothesized that these tools might represent a different culture, made by earlier people, than those documented at Trail Creek Caves and Onion Portage. The oldest cultural level at Dry Creek was dated to 11,200 years before present (rcbp), on the basis of charcoal within an ancient soil layer or paleosol at the site *(Hoffecker et al. 1996)*.

Since 1980, the number of recorded sites with ages of greater than 8,000 years (rcbp)

National Park Service photograph by Steve Klingler

Figure 6: National Park Service archeologist, Bob Gal, at the Amakomanak site in Noatak National Preserve.

National Park Service photographs by Steve Klingler

Figure 7: Sluiceway points found at sites in Noatak National Park and Preserve

has increased dramatically; over 50 of these earliest Alaska sites are from all regions of the state *(Wygal 2003)*. The oldest are still found in the Interior, with three in the Tanana Valley — the Broken Mammoth, Mead, and Swan Point sites — considered the most ancient in the state. Artifacts made of mammoth tusk ivory were excavated at the lowest levels of Broken Mammoth and Swan Point *(Figure 4)*, where paleosols and ivory were dated at between 11,600 and 12,000 years (rcbp) *(Holmes et al. 1996)*. One ivory artifact, excavated from Swan Point in 1993 *(Figure 5)*, was thought to be used as a wedge.

The success in finding these early sites has been matched by increasing laboratory capabilities. By using a C14 counting technique called Accelerator Mass Spectrometry (AMS), labs can provide dates on miniscule amounts of carbon or organic materials. For comparison between the conventional and AMS methods, it is useful to look at sample size specifications of Beta Analytic, the largest C14 laboratory in the country. They specify that a charcoal sample of no less than 1.7 grams be submitted for conventional dating, while only 5 milligrams is needed for an AMS date *(Table 1, Beta Analytic 2005)*. The benefit of this significant decrease in sample size is that it is now possible for archeologists to date sites that were previously not datable.

Another extremely significant scientific breakthrough has been in the realm of radiocarbon calibration. The amount of C14 in the atmosphere has varied considerably in the past millennia. Before the mid-1980s, these fluctuations were not accounted for

when reporting radiocarbon ages, thus giving erroneously late dates to early sites. To offset and correct for this error factor, radiocarbon dates of ancient trees, such as the bristlecone pine, were compared with growth ring dates (dendrochronology). As a result, scientists were able to produce a calibration curve which now extends back over 10,000 years *(Higham 2005)*. Using this curve, radiocarbon laboratories can now provide archeologists with radiocarbon dates in years before present, and also in calendar calibrated years. For the earliest sites, calibration can add almost 2,000 years to the radiocarbon age. For example, at the earliest level of Swan Point, the mammoth ivory artifacts dated to approximately 12,000 years BP by conventional radiocarbon methods, but were given a more accurate calibrated calendar date (cal BP) of 14,300 years cal BP *(Holmes and Potter 2002)*.

Of all the ANILCA parks, Noatak National Preserve has been the most extensively surveyed by NPS archeologists in recent years *(Figure 6)*. Their success rate in finding early sites along tributaries of the Noatak River was discussed in an *Alaska Park Science* article by Jeff Rasic (2003). He describes a distinctive type of projectile point, known as a Sluiceway point, manufactured with a unique flaking pattern along each side and polished at the base that has been found in as many as 19 sites in northwestern Interior Alaska *(Figure 7)*. Unfortunately, animal bones have not been preserved at the Sluiceway sites recorded thus far, so we are not sure what animals were being hunted. Sites with Sluiceway-like points are dated fairly consistently at about 10,000 -11,000 radiocarbon years, which can be converted to 11,400 - 13,300 calendar years. Clearly, these discoveries bring home the message that old is getting older.

The textbook archeology notion of human beings entering North America overland via the unglaciated portions of the continent in the waning years of the Pleistocene has been challenged by hypotheses about other migration routes, such as along the Beringia coastline. Alaska has traditionally been considered the gateway into North America, but recent theories suggest the possibility of migration routes from the east, across the Atlantic, or from the high Canadian Arctic. Over the next 25 years, the upcoming generation of archeologists will be challenged to search for solid evidence proving, or rejecting, these alternative theories. Even then, the ANILCA parks will continue to give archeologists fertile fields for investigation and for the discovery of sites which will expand our perceptions about the earliest Alaskans and the earliest Americans.

Radiometric Technique			Accelerator Mass Spectrometry Technique (AMS Technique)		
Material	**Recommended**	**Minimum**	**Material**	**Recommended**	**Minimum**
Charcoal	30 gms	1.7 gms	Charcoal	50 mgs	5 mgs
Shell	100 gms	7 gms	Shell	100 mgs	30 mgs
Bone	500 gms	200 gms	Bone	30 gms	2 gms

Table 1: General sample size requirements for radiocarbon dating.

REFERENCES

Anderson, D.G., D.S. Brose, D.F. Dincauze, R.S. Grumet, M.J. Shott, and R.C. Waldbauer. 2002. *The Earliest Americans: Theme Study for the Eastern United States. (draft manuscript).* National Park Service, National Register of Historic Places. Washington, D.C.

Anderson, D.W. 1968. *A Stone Age Campsite at the Gateway to America.* Scientific American 218(6):24-33.

Beta Analytic, Inc. 2005. Miami, Florida. (http://www.radiocarbon.com/sending.htm).

Elias, S. 2001. *Beringian Paleoecology: Results from the 1997 Workshop.* Quaternary Science Reviews 20:7-13.

Higham, T. 2005. Radiocarbon Dating. (http://www.c14dating.com/agecalc.html).

Hoffecker, J.F., W.R. Powers, and N.H. Bigelow. 1996. *Dry Creek.* In *American Beginnings,* edited by F.H. West. University of Chicago Press. Chicago, Illinois.

Holmes, C.E. and B.A. Potter. 2002. *Technology, Subsistence, and Settlement during the Pleistocene-Holocene Transition in Central Alaska.* Poster presented at Society for American Archaeology annual meeting in Denver, Colorado.

Holmes, C.E., R. VanderHoek, T.E. Dilley. 1996. *Swan Point.* In *American Beginnings,* edited by F.H. West. University of Chicago Press. Chicago, Illinois.

Rasic, J. 2003. *Ancient Hunters of the Western Brooks Range: Integrating Research and Cultural Resource Management.* Alaska Park Science Winter 2003: 21-25.

Vinson, D.M. 1993. *Taphonomic Analysis of Faunal Remains From Trail Creek Caves, Seward Peninsula, Alaska.* MA thesis. University of Alaska Fairbanks.

Wygal, B.T. 2003. *The Earliest Alaskans and the Earliest Americans Theme Study.* MA thesis. University of Alaska Anchorage.